OBSERVATIONS

pH and Conductivity. The influent to the "El Gallo" Wastewater Treatment Plant (site 200) showed a significant variability in pH (from 6.8 to 8.9) and conductivity (1600 to 6100 umho/cm.) Upstream sites 1100, 1300, 1400, 1600 and 1700 showed variability and extreme values, with the pH ranging from 1.6 to 12.8 and the conductivity from 1400 to 20,000 umho/cm. A pH of 1.6 denotes an extreme acidic condition and a pH of 12.8 an extreme basic or caustic condition. Conductivity is a measure of the dissolved solids present in a sample. A conductivity of 1400 umho/cm is about half the average value commonly found in wastewaters and 20,000 is an atypically high value.

Total Suspended Solids. CESPE established 300 mg/L as a maximum limit for wastewater discharges into their collection system. Sites 400, 900, 1300, 1400 and 1700 had values ranging from 334 to 669 mg/L. In particular, site 400 exceeded the limit twelve times out of the twenty-three times it was sampled.

Biochemical Oxygen Demand. CESPE established 350 mg/L as the limit for wastewater discharges into their collection system. Sites 200, 400, 900 and 1200 had values exceeding this limit (up to a maximum of 462 mg/L.)

Chemical Oxygen Demand. Values commonly found in wastewaters are up to 1000 mg/L. Values ranging from 1170 to 5580 mg/L were detected at sites 900, 1100, 1300, 1400 and 1700.

Methylene Blue Active Substances. These compounds are known as "detergents" and were detected throughout the collection system at levels commonly found in wastewaters.

Oil & Grease. This parameter was measured as "hexane extractable material" and it was observed throughout the collection system at levels that may cause blockages in the collection system and problems at the treatment plants.

Ammonia-Nitrogen. The results are consistent with those commonly found in wastewaters and the information is valuable for the design, upgrade or modification of wastewater treatment systems.

Aluminum, Arsenic, Barium, Chromium, Copper, Manganese, Nickel, Selenium, Thallium and Zinc. These metals were detected throughout the collection system at concentrations commonly found in wastewaters.

Bromodichloromethane, Chloroform and Dibromochloromethane. These compounds are known collectively as Trihalomethanes and are normal byproducts when chlorine is used in the disinfection process. These compounds were observed throughout the collection system at low values consistent with wastewaters of this type.

Phthalates. Several compounds of the phthalate family were detected throughout the collection system at levels commonly found in wastewaters. These compounds are widely used as plasticizers.

Phenol. Values ranging from “not detected” up to 100 ug/L were observed throughout the collection system. The presence of this compound at these levels is common in wastewaters as it is widely used as a disinfectant and is a component of various cleaning and mouth-washing solutions.

Toluene. This compound was detected throughout the collection system at concentrations up to 136 ug/L at site 1700. This compound is widely used as an organic solvent and as a degreaser.

Benzene and Ethlylbenzene. These are components of gasoline and may be used separately as organic solvents. They were found at low levels at sites 200, 400, 700, 900 and 1400 in one occasion at each site.

Tetrachloroethene. This compound was detected at sites 400, 1300, 1400 and 1600 at levels up to 171 ug/L (site 1300.) This compound is commonly known as tetrachloroethylene and it is widely used as a degreaser in cleaning processes.

Dichlorobenzenes. These compounds are commonly found in domestic and industrial wastewaters at the concentrations detected in this study. They are a component of many disinfectants.

Pesticides. Lindane, Chlorpyrifos, Diazinon, and Malathion were detected at low levels sporadically throughout the collection system.

ACTIONS (CESPE)

The wastewater sampled at site 1100 corresponds to the discharge from a dairy plant around which sewage blockages had occurred. CESPE shut down their connection to the sewer system based on the monitoring results and started negotiations with their management. The plant canceled some of the processes that were generating high total suspended solids, biochemical oxygen demand and oil & grease, and entered into an agreement to comply with CESPE's wastewater discharge limits.

Sites 1500/1700: A home-based auto repair shop was found discharging used oil into the sewer system. The owner was cited and no problems were detected in subsequent samplings.

Site 1300 corresponds to the discharge from a clothing tinting operation. This industry was referred to the Department of Ecology for follow up of their extreme pHs.

Site 1400 captures the effluent from a fish-flour processing operation. Their connection to the sewer system has been blocked by CESPE on several occasions and negotiations continue to have them comply with the applicable discharge limits.

Site 1600 samples the effluent from a food processing operation. The industry has a wastewater treatment plant installed, but they are being monitored closely due to an occasional high total suspended solids in their discharge.

CONCLUSIONS AND RECOMMENDATIONS

1. There is significant lack of control, with respect to pH and conductivity, on some wastewater discharges upstream to the "El Gallo" Wastewater Treatment Plant. These discharges may damage the pipes in the collection system and may cause operational problems at the treatment plant. Further monitoring and follow-up is required to identify and control the specific discharges.

2. Total Suspended Solids and Biochemical Oxygen Demand local limits should be reevaluated, implemented and enforced to protect the treatment plants with respect to increased costs and potential operational problems.

3. Oil & Grease discharges must be controlled through the strict enforcement of the limits established in the Mexican regulations (Mexican Official Norm 002.) This is necessary to prevent system blockages, control treatment costs and protect the quality of the sludge generated at the treatment plants.

4. There are no problems associated with the presence of metals in the collection system. The establishment of a monitoring program focusing on determining and enforcing compliance with the limits established by the Mexican Official Norm 002 is recommended as a preventive measure.

5. The establishment of regulations for the wastewater discharge of organic compounds, such as toluene and tetrachloroethene, and a strong monitoring program are recommended to control the presence of these compounds in the collection system. This is particularly important to protect the quality of the sludge generated at the treatment plants, as the presence of toluene in some of these sludges has already been reported.

6. Benzene and ethylbenzene are indicators of the presence of gasoline, and even though these compounds were detected sporadically and at low levels, a program should be developed to monitor and control discharges from gas stations, due to the potential harmful effects of gasoline.

7. Pesticides have a high potential to cause harmful toxicity effects, so it is important to continue monitoring their presence in the collection system. In particular, it is recommended to analyze the wastewater treatment plant effluents for these compounds, to obtain information regarding the effect the specific treatment processes have on their removal.

8. A comparison of the concentrations of the different parameters in the wastewater treatment plant influents against the concentrations in the effluents, demonstrates a very efficient operation of the treatment plants.

9. The ninety-two samples collected and analyzed during the six-month duration of this project is a limited number considering the size of the collection system. The sampling of the wastewater treatment plants must be continued to obtain timely information that can help protect the integrity of the collection system, the efficient operation of the treatment plants, the quality of